

Amendments

In the Claims:

Please substitute the following claims 1-3, 5, 7, 8, 16, 20, 21 and 23-28 for the pending claims 1-3, 5, 7, 8, 16, 20, 21 and 23-28:

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1. (Twice Amended) A cooling assembly comprising:
an electronic package having a cavity;
at least one die with active electronic components mounted using lithographic compliant interconnects within the cavity; and
at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die.
 2. (Amended) The cooling assembly of claim 1, wherein the lithographic compliant interconnects are coupled between each die and the package.
 3. (Amended) The cooling assembly of claim 2, wherein said lithographic compliant interconnects comprise spring contacts.
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5. (Amended) A cooling assembly comprising:
an electronic package having a cavity;
at least one die with active electronic components mounted using compliant interconnects within the cavity; and

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at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package,

wherein said compliant interconnects comprise spring contacts, and

wherein said spring contacts comprise lithographic springs.

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7. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

wherein each die has at least one active surface, and when the coolant circulates in the cavity the coolant directly cools each active surface of each die.

8. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

wherein each die has a plurality of surfaces within the cavity including at least one active surface associated with respective active electronic components, and when the coolant circulates in the cavity the coolant directly cools each surface of each die, thereby reducing thermal gradients or hot spots on each active surface of each die and increasing the operating range of each die.

16. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

wherein said package further comprises a bottom substrate on one side of the cavity, wherein each die with active electronic components is connected to the bottom substrate by the compliant interconnects, and wherein the active electronic components face the bottom substrate and contact coolant surrounding the compliant interconnects within the cavity.

20. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

wherein said package further comprises a top substrate with a top surface representing an exterior surface of the package and wherein the top surface includes contacts, whereby external components can be electrically coupled to each die via the contacts.

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21. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

wherein said package further comprises:

a top substrate;

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a bottom substrate; and
interconnection elements that provide electrical paths extending through
the top substrate and the bottom substrate.

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23. (Amended) A cooling assembly comprising:

an electronic package having a cavity;
at least one die with active electronic components mounted using compliant
interconnects within the cavity; and
at least one coolant port that allows a coolant to enter the cavity and directly cool
the active electronic components of each die,
wherein the compliant interconnects are coupled between each die and the
package; and
a coolant circulation system coupled to said at least one coolant port, wherein the
coolant circulates within the package and directly contacts all surfaces of each die to
directly cool active electronic components during their operation.

24. (Amended) A cooling assembly comprising:

an electronic package having a cavity;
at least one die with active electronic components mounted using compliant
interconnects within the cavity; and
at least one coolant port that allows a coolant to enter the cavity and directly cool
the active electronic components of each die,
wherein the compliant interconnects are coupled between each die and the
package;

a cooling member; and

one or more heat radiators, wherein each die is immersed in the coolant and each heat radiator transfers heat generated by each die from the coolant to said cooling member.

25. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package; and

at least one non- contacting compliant interconnect coupled to a surface of said at least one die, whereby, heat can be further directed away from the surface of a die.

26. (Amended) A cooling assembly comprising:

an electronic package having a cavity;

at least one die with active electronic components mounted using compliant interconnects within the cavity; and

at least one coolant port that allows a coolant to enter the cavity and directly cool the active electronic components of each die,

wherein the compliant interconnects are coupled between each die and the package, and

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wherein said package further comprises:

a top substrate; and

a bottom substrate,

wherein each die is flip-chip bonded to said top substrate.

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27. (Amended) A method for direct cooling of active electronic components,
comprising:

coupling active electronic components through lithographic compliant
interconnects to a substrate of a package such that the active electronic components face
the substrate;

sealing the attached active electronic components and compliant interconnects
within a cavity of the package; and

circulating coolant through the package cavity to directly contact the active
electronic components.

28. (Twice Amended) A cooling assembly, comprising:

means for sealing at least one die with active electronic components in a package
the die mounted within this package using lithographic compliant interconnects; and

means for circulating coolant through the package during operation of the active
electronic components to reduce thermal variations across each die.

Please add new claims 29-30 as follows:

29. (New) A cooling assembly comprising:

an electronic package having a cavity;

at least one die mounted using compliant interconnects within the cavity, the

compliant interconnects including non-contacting compliant interconnects; and

at least one coolant port that allows a coolant to enter the cavity and directly cool
the at least one die.

30. (New) A cooling assembly comprising:

an electronic package having a cavity;

at least one die mounted using compliant interconnects within the cavity such that

the compliant interconnects exert pressure to keep the die in place; and

at least one coolant port that allows a coolant to enter the cavity and directly cool
the at least one die.

31. (New) A cooling assembly comprising:

an electronic package having a top substrate, a bottom substrate and a cavity
between the top and bottom substrates, the substrates coupled to each other using
compliant interconnects located within the cavity;

at least one die within the cavity and bonded to the top substrate; and

at least one coolant port that allows a coolant to enter the cavity and directly cool
the at least one die.
